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(19)(CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Remote Control Helmet Visor

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(57) 11 Claims

ABSTRACT

A protective helmet for use by persons riding motorcycles, snowmobiles, ATV's and the like has a power operated visor. A motor is mounted on the helmet and drives the visor through an appropriate drive train. The motor is actuated through a radio control link by a transmitter mounted on the vehicle. The transmitter is in turn actuated by a rocker switch positioned on the vehicle adjacent the hand grips. Mechanisms are provided for disengaging the motor and engaging a click stop mechanism for manual operation of the visor.

REMOTE CONTROL HELMET VISOR

The present invention relates to protective helmets of the type used by persons riding on motorcycles, snowmobiles, all terrain vehicles and the like. The invention relates more particularly to a helmet of this type having a power operated visor.

Motorcycle and the like helmets are frequently equipped with visors that open and close over at least part of the face of a wearer. Opening and closing the visor while in motion involves the release of one hand from the vehicle steering and other controls. This is not recommended practice. The present invention proposes a power operated visor that can be operated without releasing the vehicle controls.

According to the present invention there is provided a protective helmet having a visor mounted on the helmet for movement between an open position for exposing at least part of the face of a wearer of the helmet and a closed position extending across the face of a wearer, and a visor operating system comprising:

motor means mounted on the helmet and engaged with the visor for moving the visor between the open and closed positions;

motor actuating means adapted to be mounted at a position remote from the helmet for selective manual actuation, the motor actuating means generating motor control signals in response to manual actuation thereof; and

communication means communicating between the motor actuating means and the motor means for transmitting the motor control signals from the motor actuating means to the motor means for operating the motor.

Preferably, the motor actuating means is a radio frequency transmitter mounted on the vehicle and controlled by a readily accessible switch, for example on the handlebars. A receiver in the helmet receives the signals transmitted and causes the motor

to raise or lower the visor according to the signal received.

It is preferred to include a manual override so that the visor can be operated by hand when necessary. This may include a mechanism for disengaging the motor and engaging a mechanical restraint, preferably in the form of a click stop mechanism. An escape mechanism for releasing the drive train when excessive force is applied to the visor may also be included.

In the accompanying drawings, which illustrate an exemplary embodiment of the present invention:

Figure 1 is a front view of a helmet according to the present invention;

Figure 2 is a side view of the helmet;

Figure 3 is a right side view of the helmet with the right side cowling removed;

Figure 4 is a view along line 4-4 of Figure 3;

Figure 5 is a view along line 5-5 of Figure 4;

Figure 6, on the same sheet as Figure 3, is a left side view of the helmet with the cowling removed;

Figure 7 is an electrical schematic of the vehicle mounted electrical system; and

Figure 8 is an electrical schematic of the helmet mounted electrical system.

Referring to the accompanying drawings, there is illustrated a helmet 10 having a hard helmet shell 12 lined with shock absorbing material in the usual way. The helmet has a face opening 13 on the front side that may be closed by a transparent visor 14. The visor is mounted on the helmet for pivotal movement between a closed position shown in solid line in Figure 2 and the open position shown in broken line in that Figure.

The helmet is equipped with a right side cowling 16 and a left side cowling 18 mounted externally on the helmet and enclosing the components of an operating system for controlling movement of the visor.

On the bottom of the right side cowling is an on-off toggle switch 20 for the visor operating mechanism. Immediately in front of the toggle switch is a pilot light 22 that is illuminated when the operating mechanism is on. Immediately in front of the pilot light is a motor release lever 24. This lever is mounted on the helmet, as will be described more fully in the following, and projects through a slot (not shown) in the cowling 16.

On the left side of the helmet, a manual visor restraint lever 26 projects through a slot in the bottom of the cowling 18 as will be described more fully in the following.

Referring to Figures 3, 4 and 5, the right side of the visor 14 has a lug 28 at the upper rear corner that extends over a circular boss 30 (Figure 4) on the side of the helmet. A pivot shaft 32 projects from the boss through a hub 34 fixed to the visor lug 28. On the outer side of the hub is a spur gear 38. This meshes with a smaller pinion 40 below the gear 38. The pinion is mounted co-axially with a bevel gear 42 on a slide 44. The slide also carries a motor 46 driving a second bevel gear 48, meshing with the bevel gear 42. The motor is a small servo type motor modified to rotate continuously in both directions. The motor has an integral shut off system for shutting off the motor when the driven element, in this case the visor, reaches the end of its travel.

The slider 44 is mounted on a slide base 50 fixed to the side of the helmet below the visor pivot 42. This slide base includes a channel 52 that receives a rail 54 mounted on the slide 44 so that the motor and the drive train consisting of bevel gears 48 and 42 and pinion 40 slide up and down towards and away from the gear 38 to cause

engagement and disengagement of the gears 40 and 38.

At the bottom of the slide base 50 is a flange 56 that projects outwardly below the slide 44 and motor 46. A rod 58 projecting downwardly from the motor extends through a bore 60 in this flange. A spring 62 surrounding the rod 58 is compressed between the motor 46 and flange 56 to bias the slide and the components carried on it upwardly from the flange 56, thus urging the gears 38 and 40 into engagement.

A tension link 64 is connected to the slide 44 and extends downwardly to an arm 66 projecting from a rotary shaft 68. The shaft carries the release lever 24. A spring clip 72 acts as a retainer for the lever 24 to hold the lever, the slide, the motor and the drive train in a released position with the gear 40 out of engagement with the gear 38, against the force of the spring 62.

Mounted on the side of the helmet immediately behind the slide base 50 is a radio frequency receiver 74. This receiver is of the type used in radio controlled model aircraft. It is intended to receive a coded signal from a transmitter, to decode the signal and to produce motor control signals for driving the motor 46.

As illustrated in Figure 6, on the left side of the helmet the visor 14 has a visor lug 75 corresponding to the lug 28 on the right hand side. The lug is pivotally mounted on a pivot shaft 76 co-axial with the pivot shaft 42 on the opposite side. A toothed disc 78 is secured to the lug to rotate with it. Immediately below the toothed disc is a brake block 80 with a convex upper surface 81 formed with teeth 82. The teeth 82 engage the teeth on the disc 78 to retain the visor in position. The brake block 80 is fixed to the end of a rod 84 that slides in a bore in a mounting block 86 fixed to the side of the helmet below the brake block 80. Two coil springs 88 extend between the mounting block 86 and the brake block 80 to bias the brake block 80 upwardly into engagement with the

disc 78.

A lower end of the rod 84 is connected eccentrically to a disc 90 rotatable on a shaft 92 fixed to the helmet. The disc 90 also carries a boss 94 that serves as an actuator for a micro switch 96. The retainer lever 26 is fastened to the disc 90 so that as the lever is moved backwards and forwards it will either pull down on the rod 84, releasing the brake block 80 from the disc 78, or release the brake block to move upwardly under the influence of springs 88. In the released position, when the springs are compressed, the lever 26 engages a spring clip 97 to hold the components in this released condition.

Mounted on the side of the helmet immediately behind the brake block 80 and mounting block 86 is a battery pack 98 .

Figure 7 is an electrical schematic of a part of the system that is mounted on the vehicle to be ridden. The vehicle has a battery 100 with a negative ground and a horn circuit 102 connected to the positive battery terminal. The present system is tapped off the horn circuit. It includes a voltage regulator 104 that provides a regulated voltage to an encoder circuit 106. Three lines 108, 110 and 112 lead from the encoder circuit to a single pull double throw switch 114. This is preferably a rocker switch with a neutral position in which neither of the switch contacts is closed. Line 108 is a power line leading to the pole of the switch. The line 110 delivers an "up" signal to the encoder 106 when the switch is closed to deliver power to that line. Similarly, line 112 delivers a "down" signal to the encoder 108 when the switch is closed to deliver power to line 112.

The encoder delivers encoded up and down signals to a transmitter 116 which transmits the signals locally using an antenna 120. This entire system is mounted on the vehicle, e.g. a motorcycle, with the switch 114 adjacent one of the hand grips so that it can be thumb operated without releasing the hand grip. Apart from the physical mounting

of the components, the only interconnection to the vehicle system is the connection of the positive lead of the regulator to battery power, and the grounding of the regulator.

The circuitry of the helmet mounted system is illustrated in Figure 8. The battery 122 is carried by the battery pack 98 on the left hand side. The negative terminal of the battery is connected to a ground line 124, which is in turn connected to the pilot light 22 and the receiver 74. The positive terminal of the battery 122 is connected through the on/off toggle switch 20 to the pilot light 22 so that when the switch is closed the light will be on. In series with the on/off switch 20 is the microswitch 96 which in turn delivers power to the receiver 74. The receiver is electrically connected to the motor 96 to drive the motor in opposite directions according to the signals received from the transmitter.

The microswitch 96 is closed when the brake block 80 is released from the toothed disc 78 to allow normal operation of the motor. When the brake block is engaged, the power to the receiver is shut off so that the motor will not operate against the brake.

Returning to Figures 3 and 4, these drawings illustrate the normal drive condition of the motor drive train. Moving the lever 24 draws the motor and drive train away from the gear 38 to disengage the drive. This leaves the visor free to pivot up and down. To prevent unwanted free movement of the visor, the lever 26 is pushed to the rear to engage the brake block 80 with the toothed disc 82. This provides a click stop type of restraint on the movement of the visor, with the teeth of disc 82 camming the teeth of the brake block downwardly so that the visor can be placed in a partially open position if desired.

With the brake block 80 disengaged and the gears 38 and 40 engaged, excessive force on the visor tending to either open or close the visor with the motor inactive will cause the teeth of the gear 38 to cam over the teeth of pinion 40, displacing

the gear 40 and the slide 44 downwardly against the spring 62. The gears then act as a ratchet clutch providing an override or release function to prevent damage to the motor and drive train when the visor is raised or lowered manually while the drive train is engaged.

As will be observed from the foregoing, the remote mode of operation of the helmet visor requires that both of the levers 24 and 26 are in the forward position. For manual operation, both levers are in the rear position, disengaging the motor and engaging the manual latch mechanism.

While one embodiment of the present invention has been described foregoing, it is to be understood that other embodiments are possible within the scope of the invention, which is to be ascertained solely by reference to the appended claims.

CLAIMS:

1. A protective helmet having a visor mounted on the helmet for movement between an open position for exposing at least part of the face of a wearer of the helmet and a closed position extending across the face of a wearer, and a visor operating system comprising:

motor means mounted on the helmet and engaged with the visor for moving the visor between the open and closed positions;

motor actuating means adapted to be mounted at a position remote from the helmet for selective manual actuation, the motor actuating means generating motor control signals in response to manual actuation thereof; and

communication means communicating between the motor actuating means and the motor means for transmitting the motor control signals from the motor actuating means to the motor means for operating the motor.

2. A helmet according to Claim 1 wherein the motor actuating means comprise actuator mounting means for mounting the actuating means on a vehicle for operation by a vehicle operator.

3. A helmet according to Claim 2 wherein the actuator mounting means comprise means for mounting the motor actuating means on vehicle handle bars.

4. A helmet according to Claim 1, 2 or 3 wherein the communication means comprise a radio frequency transmitter mounted on the vehicle and responsive to operation of the motor actuating means for selectively transmitting visor open and visor close radio signals, and a radio frequency receiver mounted on the helmet for receiving the visor open and visor close radio signals and for controlling the motor to open and close the visor respectively in response to the radio signals.

5. A helmet according to any one of Claims 1 through 4 including means for disengaging the motor from the visor.

6. A helmet according to Claim 5 including visor restraining means engageable between the helmet and visor for restraining the visor against free movement between the open and close positions.

7. A helmet according to Claim 6 wherein the restraining means comprise a brake.

8. A helmet according to Claim 1 including a drive train coupling the motor to the visor, the drive train including force limiting means releasable to disengage the drive train in response to the exertion of a predetermined force upon the visor.

9. A helmet according Claim 8 wherein the force limiting means comprise resilient means biasing two gears in the drive train into engagement.

10. A helmet according to any one of Claims 1 through 9 wherein the motor is a reversible electric motor.

11. A helmet according to Claim 10 wherein the motor includes shut off means responsive to the visor reaching the open or closed position thereof for shutting off the motor.

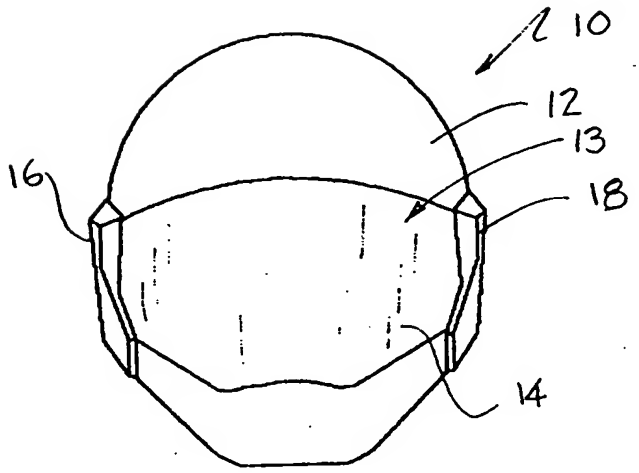

FIG. 1

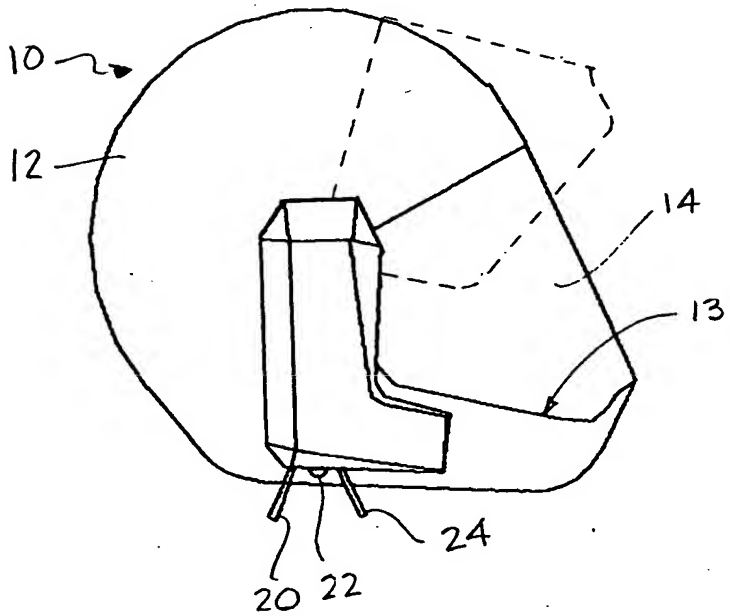

FIG. 2

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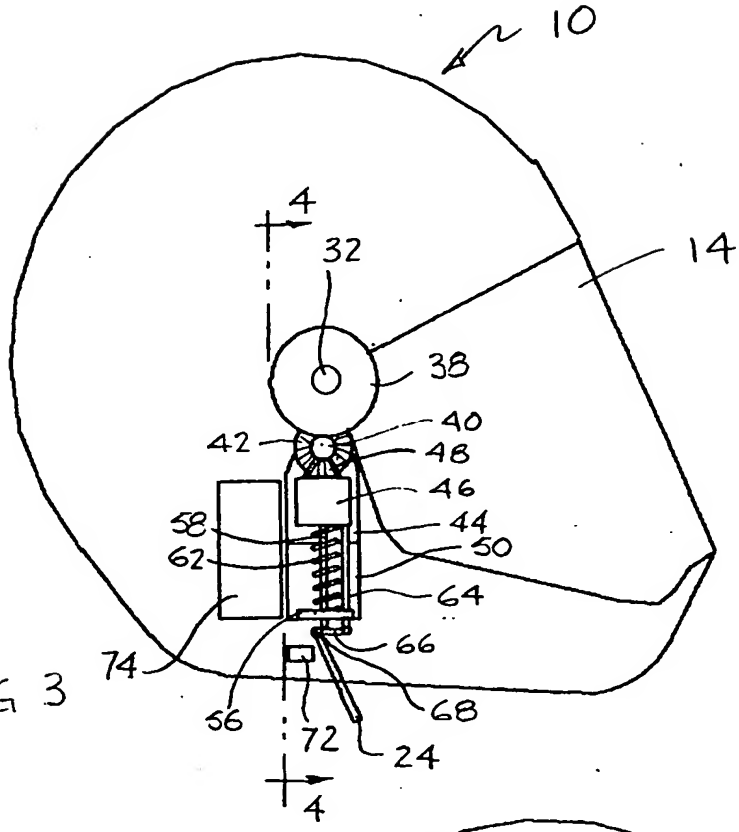

FIG 3

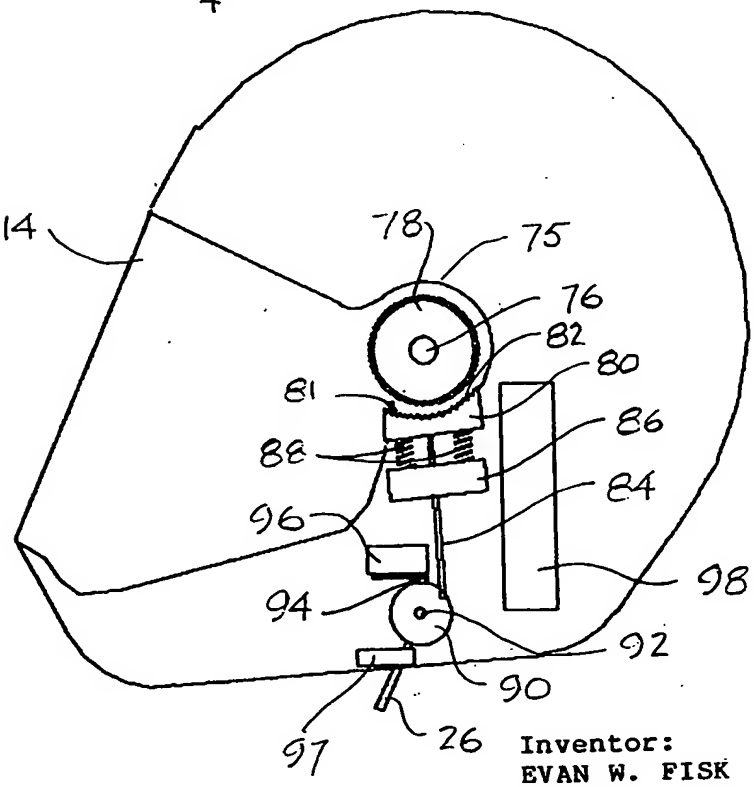

FIG. 6

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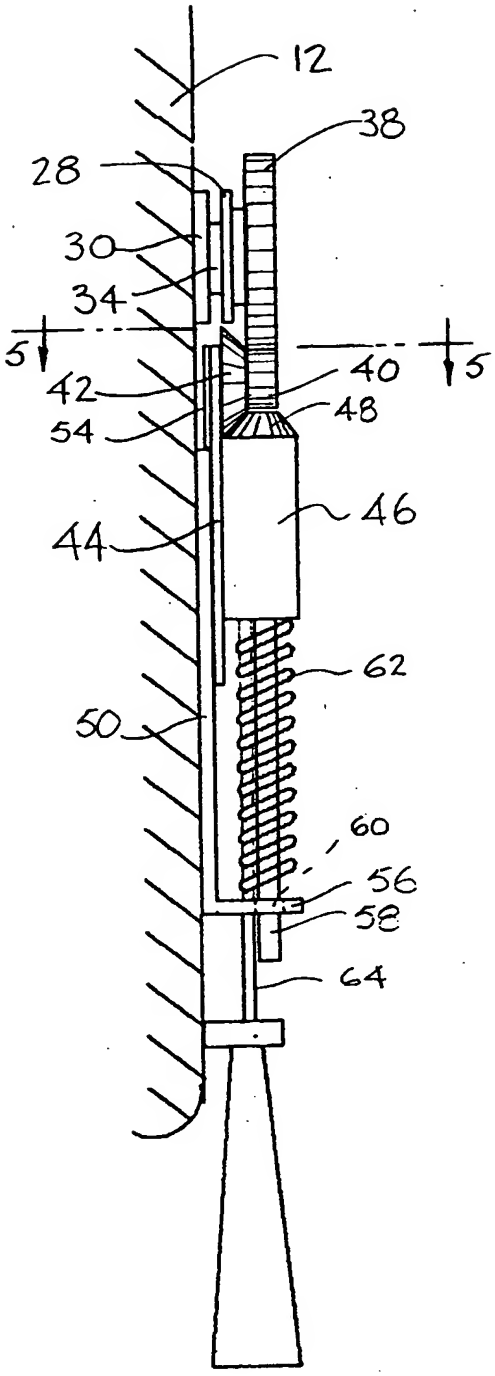

FIG. 4

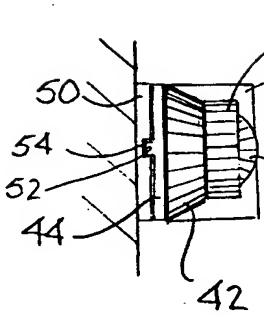

FIG. 5

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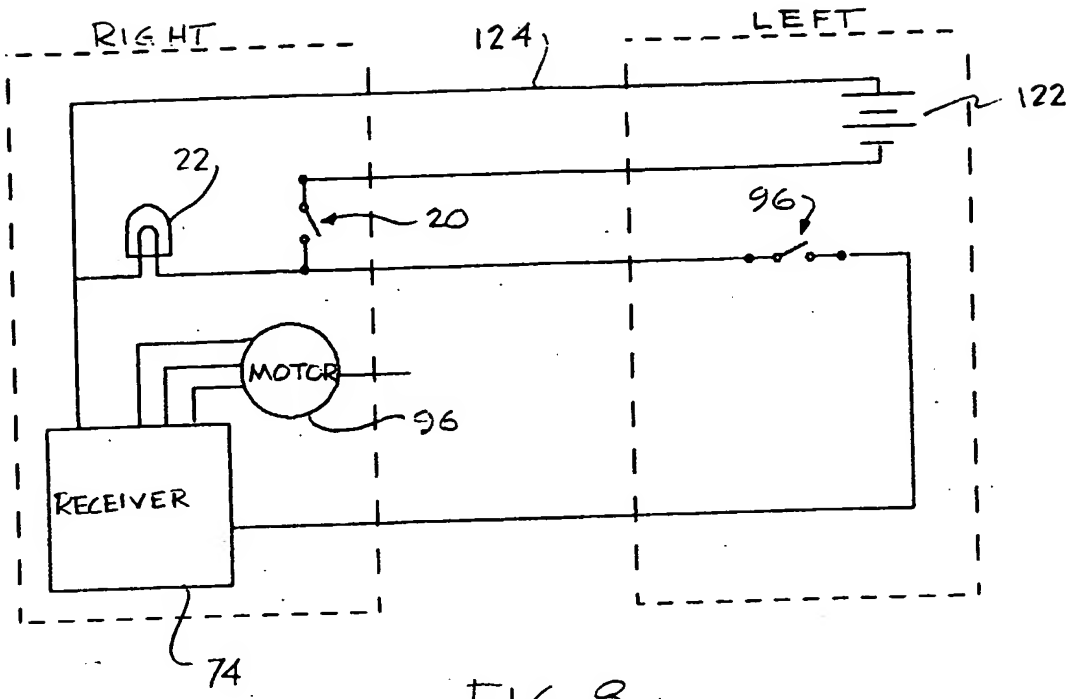

FIG. 8

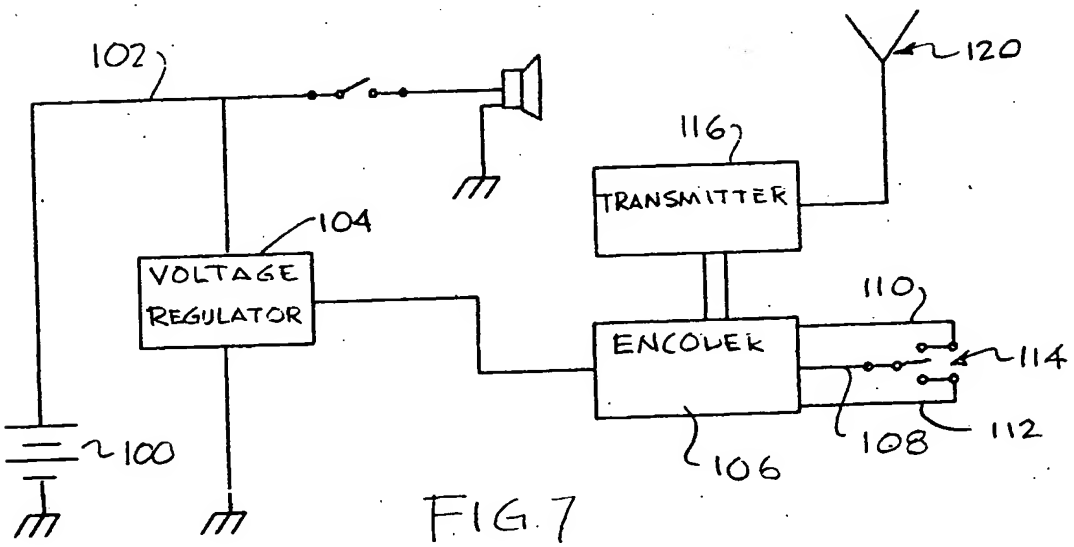

FIG. 7

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